

Biodiesel Blended Fuels

What is biodiesel?

- Biodiesel is a fuel made from plant-based fats and oils. It has a chemical form that makes it compatible with compression ignition in a diesel engine.
- Biodiesel comes in different concentrations; B100 is 100% plant-based biodiesel, B20 is 20% plant-based biodiesel and 80% petroleum diesel. You may see other blends such as B50 or B5, however B100 and B20 are the most common.

Can I use B20 in my current diesel engine?

- In general, biodiesel can be used in existing engines and fuel injection equipment with little impact to operating performance. Engines older than 1993 have certain parts that will break down with repetitive high blend biodiesel usage.
- Check with the Original Engine Manufacturer's (OEM) recommendations. Most OEM's have approved up to B5 blends. Some have approved up to B20 blends in certain vehicle engines if the fuel meets certain specifications and standards.
- One OEM has approved B100 for use in certain farm equipment. Please view the engine manufacturer's website or speak with a dealer to determine the recommended biodiesel blend. You can get general information from the [National Biodiesel Board](#).

What should I look for if I start using B20?

- Make sure you are buying high quality fuel from a reputable distributor. This is one who will service the fuel if any issues arise and can guarantee that their fuel meets the required standards and specifications for quality (the standard is referred to as ASTM D6751).
- You may require more frequent fuel filters changes when you first start using the fuel, but that will be determined by how regularly you maintain the engine and the quality of the fuel you purchase.

Will biodiesel perform as well as diesel?

- To start, you may not experience any changes in the performance of the vehicle and that is normal. Sometimes fleet operators will add a low blend of biodiesel to their fuel portfolio and the drivers of the vehicles will not notice a change.
- In testing, B20 has shown similar fuel consumption, horsepower, and torque as conventional diesel fuel. Biodiesel has a higher cetane number and higher lubricity than U.S. diesel fuel. It has an energy content between that of #1 and #2 diesel fuels.

Will biodiesel perform well in cold weather?

- Biodiesel will thicken into a gel in very cold temperatures, just as the common #2 diesel does.
- Pure biodiesel will gel in warmer temperatures than #2 diesel fuel, however typical B20 blends are managed with the same fuel management techniques as #2 diesel.
- Blends at B5 and lower have virtually no impact on cold flow. (Source: [National Biodiesel Board](#))

Will biodiesel cause filters to plug?

- Biodiesel has a solvent effect proportionate to the amount of biodiesel in the fuel; B100 has a higher solvent effect than B20. This solvent effect will clean your fuel system and may release deposits accumulated on tank walls and pipes from previous diesel fuel usage.
- With higher blends of biodiesel, the release of deposits may initially clog filters and you should be proactive in replacing clogged fuel filters. Once the petroleum build-up is

eliminated you can return to your regular replacement schedule. This issue is less prevalent with B20 and lower blends. There is no evidence that lower-blend levels such as B2 have caused filters to plug.

Are there long term effects on the engine if I use biodiesel?

- In general, B100, can soften and degrade certain types of elastomers and natural rubber compounds over time. Using high percent blends can impact fuel system components (primarily fuel hoses and fuel pump seals) that contain elastomer compounds incompatible with biodiesel. The effect is lessened as the biodiesel blend level is decreased. Studies of B20 and lower blends have not shown any long term effects for in specification biodiesel. (Source: [National Biodiesel Board](#))

Can I use vegetable oil in my diesel engine? I've read about ways to do it on the internet.

- Raw vegetable oil cannot meet biodiesel fuel specifications and quality standards. It is not registered with the Environmental Protection Agency and is not a legal motor fuel.
- The Engine Manufacturers Association states in a March 2006 publication "Raw or refined vegetable oil, or recycled greases have significantly different and widely varying properties that are not acceptable for use in modern diesel engines. For example, the higher viscosity and chemical composition of unprocessed oils and fats have been shown to cause problems in a number of areas; (i) piston ring sticking; (ii) injector and combustion chamber deposits; (iii) fuel system deposits; (iv) reduced power; (v) reduced fuel economy and (vi) increased exhaust emissions."
- An owner of a vehicle can try to make their own biodiesel fuel but it will void the engine warranty and may result in long-term damage to the vehicle and the environment.

Biodiesel Supply in the US seems to be growing. At what level?

National biodiesel use:

- 288 million gallons sold in 2006, according to National Biodiesel Board, from 2 million gallons in 2000.
- Production Capacity of over 1.4 billion gallons as of June 2007.
- Minnesota only state with state-wide blending – B2. Other states will blend state-wide when in-state production capacity reaches stated goals.

Colorado Biodiesel Production and Use

- 2 local biodiesel producers
 - BioEnergy of Colorado, Denver, 18 million gallons per year (mmgy) production capacity.
 - American AgriDiesel, Burlington, 10 mmgy production capacity.
- 22 biodiesel stations
 - B20-B100 blends sold.
 - 5,000-40,000 gallons per month sold at each station.
 - Customer satisfaction reported as very high.

(Source: [BBI International](#))

I heard that biodiesel is cleaner burning fuel than regular diesel. Are tailpipe emissions lower?

As reported by the National Biodiesel Board the following results are considered standard.

	B20	B100
Regulated		
Total Unburned Hydrocarbons	-67%	-20%
Carbon Monoxide	-48%	-12%
Particulate Matter	-47%	-12%
NOx (*Debatable)	+10%	+2% to-2%
Non-Regulated		
Sulfates	-100%	-20%*
PAH (Polycyclic Aromatic Hydrocarbons)**	-80%	-13%
nPAH (nitrated PAH's)**	-90%	-50%***
Ozone potential of speciated HC	-50%	-10%

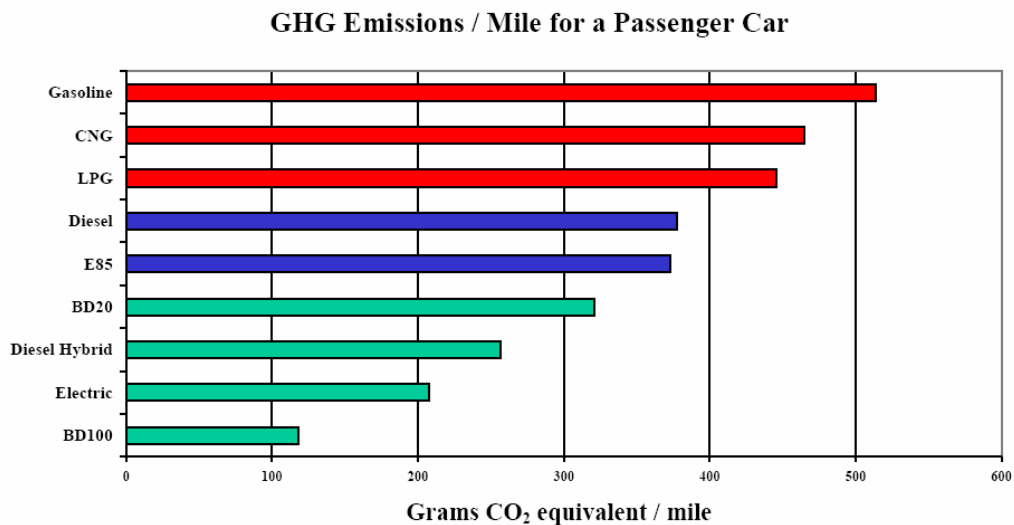
* Estimated from B100 result

** Average reduction across all compounds measured

*** 2-nitroflourine results were within test method variability³

I want to reduce my carbon footprint and do something about global warming. Are greenhouse gas emissions lower for biodiesel than regular diesel?

Biodiesel has the best full-cycle or well-to-wheel emissions of any alternative fuel, due to the double benefit of growing feedstock absorbing CO₂ and biodiesel (& diesel) emissions not very high in CO₂.



(Graph of standardized vehicle emissions from oil-based and Renewable Fuels. Compiled by Harvard University's Alternative Fuel Vehicle Program using Argonne National Laboratory's GREET Model version 1.5a.)